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AERIAL PHOTOGRAPHIC ANALYSIS LUSHER AVENUE GROUNDWATER CONTAMINATION STUDY AREA

Elkhart, Indiana

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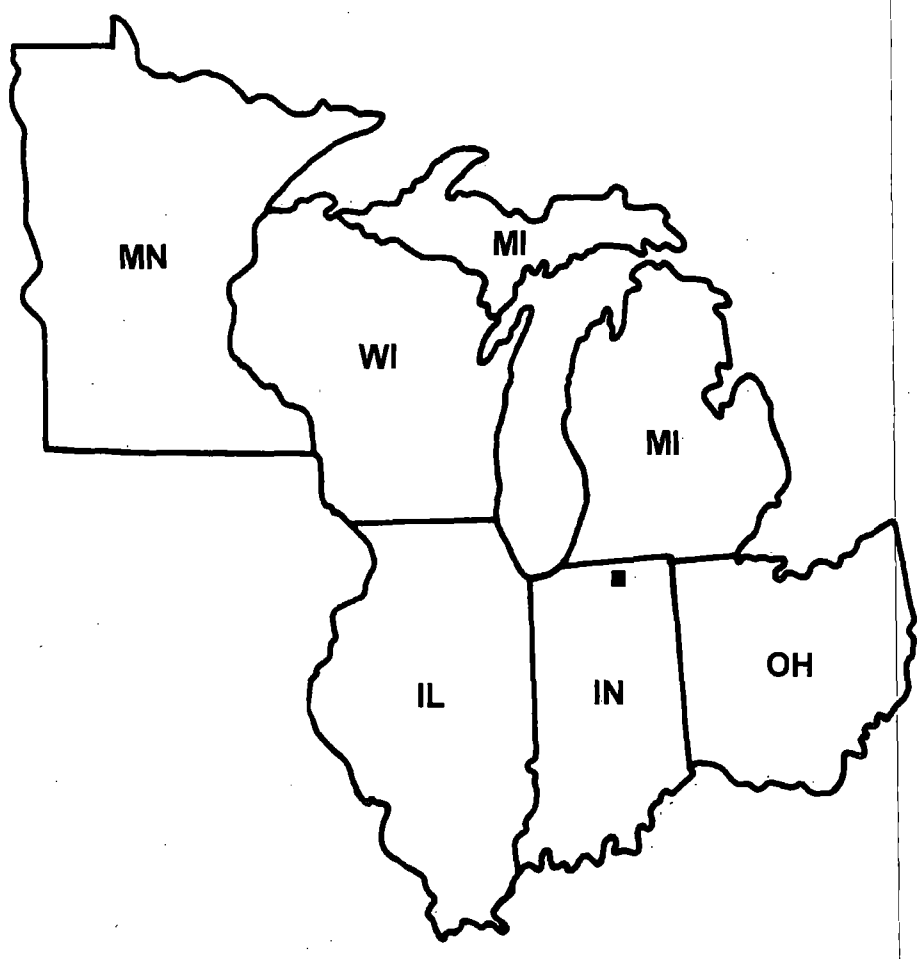
EPA Region 5



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AERIAL PHOTOGRAPHIC ANALYSIS OF LUSHER AVENUE GROUNDWATER CONTAMINATION STUDY AREA

Elkhart, Indiana

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Task Order Contracting Officer Representative

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NOTICE

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ABSTRACT

This report presents the results of an historical aerial photographic analysis of the Lusher Avenue Groundwater Contamination study area in Elkhart, Indiana. The urban study area covers approximately 3.3 square kilometers (1.3 square miles) in western Elkhart. The study area is bounded by the St. Joseph River to the north, to the east by Oakland Avenue, Hively Avenue to the south, and to the west by Nappanee Street. For this analysis, eleven dates of historical aerial photographs, spanning the period from 1938 through 2010, were analyzed and selected for inclusion in this report.

Of specific interest to the Region 5 Office of the U.S. Environmental Protection Agency (EPA) are potential sources of volatile organic compounds that threaten the groundwater supplies and the adjacent St. Joseph River. This historical photographic analysis, funded under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), was prepared to identify facilities which may have conducted chemical handling or waste disposal activities. The report will aid EPA field investigators to develop field sampling strategies.

The findings of the historical photographic analysis identified features/conditions of environmental concern. Features/conditions located between Franklin Street and Lusher Avenue included four probable disposal pits, two former fuel distributors with fuel/oil storage tanks, probable open disposal dumps, and suspicious ground scars that may be locations of waste disposal activity. The features/conditions located between Lusher and Leininger avenues included possible waste disposal trenches, suspicious ground scars that may be locations of waste disposal activity, and a probable disposal pit. Features/conditions located between Leininger and Hively avenues included waste disposal pits, suspicious ground scars that may be locations of waste disposal activity, four possible disposal trenches, and one possible area of vegetation stress.

The EPA Center of Environmental Computing, Office of Technology Operations and Planning, Office of Environmental Information, in Research Triangle Park, North Carolina, prepared this report for the EPA Region 5 Hazardous Waste Management Division in Chicago, Illinois and the EPA Office of Superfund Remediation Technology Innovation in Washington, D.C.

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INTRODUCTION

This report presents the results of an historical aerial photographic analysis of the Lusher Avenue Groundwater Contamination study area in Elkhart, Indiana. The densely urbanized study area covers approximately 3.3 square kilometers (1.3 square miles) in western Elkhart. The study area is bounded on the north by the St. Joseph River, to the east by Oakland Avenue, to the south by Hively Avenue, and to the west by Nappanee Street. Surface runoff within the urbanized study area enters the city storm water-sewer system and is directed into the St. Joseph River. For this analysis, eleven dates of historical aerial photographs, spanning the period from 1938 through 2010, were reviewed and selected for inclusion in this report.

Of specific interest to the Region 5 Office of the U.S. Environmental Protection Agency (EPA) are potential sources and pathway portions of volatile organic compounds that threaten the groundwater supplies and the adjacent St. Joseph River. This historical photographic analysis, funded under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), was prepared to identify facilities with chemical handling or waste disposal activities as potential source of ground water contamination. The report will aid EPA field investigators to develop field sampling strategies.

The findings of the historical photographic analysis identified over twenty locations of sites or features/conditions of environmental concern. These sites or features/conditions identify possible waste disposal activity that was observed on historical photos and are annotated for reference. Many features are no longer evident such as disposal pits/trenches because they may have been eventually filled, leveled, and in some cases built over. They include:

1 - A fuel/oil distributor facility containing several storage tanks and a disposal pit was observed from 1952 through 1973.

2 - A second fuel/oil distributor facility with storage tanks was observed in 1965 and 1967.

3 - Suspect ground scars that may be locations of waste disposal activity and two open dumps, along the southern side of Franklin Street, were visible from 1951 through 1967.

4 - Nine possible disposal trenches/pits, north of Lusher Avenue, were noted 1951 through 1987.

5 - Ten possible disposal trenches/pits and suspicious ground scars that may be locations of waste disposal activity, between Lusher and Hively avenues, were noted from 1957 through 1987.

6 - An area of possible vegetation stress was noted next to a former disposal pit in 2005 and 2010.

A Glossary, defining features or conditions identified in this report, follows the Historical Photographic Analysis section. Sources for all maps, aerial photographs, and collateral data used in the production of this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Task Order Contracting Officer Representative. Historical aerial photographs used in the analysis of this study area have been digitally scanned and printed for use in this report. A transparent overlay with interpretative data is affixed to each of the digital prints. See the Methodology section for a discussion of the scanning and printing procedures.

The EPA Center of Environmental Computing, Office of Technology Operations and Planning, Office of Environmental Information, in Research Triangle Park, North Carolina, prepared this report for the EPA Region 5 Hazardous Waste Management Division in Chicago, Illinois, and the EPA Office of Superfund Remediation Technology Innovation in Washington, D.C.

Figure 1. Study area location map, Indiana (USGS, 1972). Approximate scale 1:2,500,000.

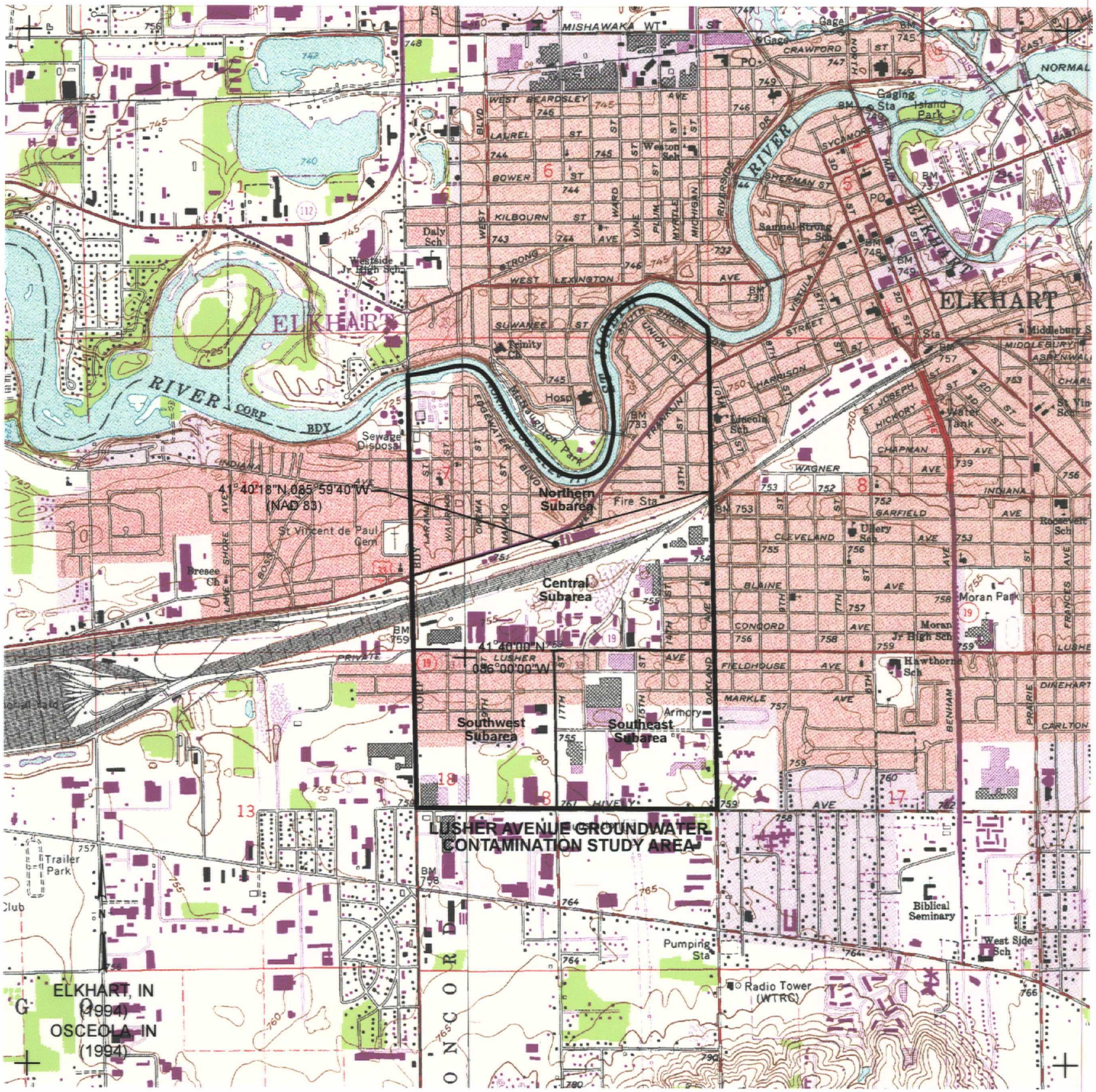

Figure 2. Local study area location map, Elkhart, Indiana (USGS, 1994) and Osceola, Indiana (USGS,1994). Approximate scale 1:24,000.

METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area

of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not necessarily denote legal property lines or ownership.

Digital Diapositives

Some film vendors no longer supply analog film products (e.g., diapositive transparencies) to their customers. Digital files, created by scanning the original analog film products, are provided. The digital file, a representation of an original analog film product, can be analyzed either by computer viewing techniques or by creating a secondary diapositive from the digital file and viewing the secondary diapositve on a light table. The result of this process of converting an analog diapositive image to a digital file may be a reduction in the photographic resolution. A potential consequence of this in the realm of aerial photographic analysis is a lower confidence in the identification of features or conditions of environmental significance. For example, what may have been identified with certainty as "a drum" on the analog version of the diapositive may, on the digital diapositive, only be determined to be "a probable drum."

Color Infrared Photographs

Some photographs used for this analysis were made from color infrared film. Normal color film records reflected energy in the blue, green, and red portions of the electromagnetic spectrum. Color infrared film differs in that

it is sensitive not only to reflected blue, green, and red energy, but also to reflected energy in the infrared portions of the electromagnetic spectrum; however, the blue energy is filtered out and only the green, red, and infrared energy is recorded. When color infrared film is processed, it displays "false" colors that do not correspond with the true colors of the features photographed. For example, features that are highly reflective in the infrared portion of the spectrum, such as healthy vegetation, appear red to magenta on color infrared film. The false color displayed by a feature is produced in accordance with the proportions of green, red, and infrared energy it reflects. These proportions are referred to as the "spectral reflectance characteristics" of the feature. To interpret the true color of a particular feature accurately from color infrared film, a knowledge of the spectral reflectance characteristics of that feature is required. This information is not readily available for the majority of features identified in this report. Therefore, unless otherwise indicated, no attempt has been made to interpret the true colors of the features identified on the color infrared film analyzed for this report.

Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

HISTORICAL PHOTOGRAPHIC ANALYSIS

The Lusher Avenue Groundwater Contamination study area located in Elkhart, Indiana, extends from the St. Joseph River to the north to Hively Avenue to the south and extends east to Oakland Avenue and west to Nappanee Street. For purposes of this report the study area is divided into four subareas: the Northern Subarea, the Central Subarea, the Southwest Subarea, and the Southeast Subarea (Figure 3).

The annotated site boundaries shown in this report are not legal property boundaries but are general operational boundaries between facilities derived from street borders or fence lines. Not all items discussed in the narrative are annotated of the overlays due the photo scale and space restrictions within the photo figures.

OCTOBER 28, 1938 (FIGURE 3)

Northern Subarea

The Northern Subarea is predominately occupied by residential houses; however, the area north of Franklin Street between Nappanee Street and Elreno Street, has few houses and contains open areas of undeveloped urban lots.

Central Subarea

Site 1 - A large railroad (R/R) marshaling yard, which dominates the Central Subarea trends northeast-southwest between Nappanee Street and Oakland Avenue. The railroad marshaling yard is apparently undergoing changes to reduce its size. The ruins of a building (B) in the railroad marshaling yard is observed to the west of 17th Street. Several spur tracks contain railroad cars in the southern portion of the railroad marshaling yard.

Site 2 - An operational industrial manufacturing facility is located east of the railroad marshaling yard along Oakland Avenue, between Garfield and Cleveland avenues. The site contains a group of five industrial buildings and a staging yard along its western side that contains piles of dark-toned material.

Site 3 - A large industrial manufacturing facility is located east of the railroad marshaling yard along 14th Street between Wolf and Blaine avenues. The facility appears vacant and may be in transition. It consists of a large complex of commercial/industrial buildings and a staging yard located along the western side of the building complex. Light-toned ground scars (LT GS) at this staging yard indicate ground disturbances, that are probably associated with construction activity.

Southwest Subarea

The Southwest Subarea contains predominately residential houses north of Markle Avenue and farmland south of Markle Avenue.

Southeast Subarea

The Southeast Subarea contains predominately residential houses north of Markle Avenue and farmland south of Markle Avenue.

LEGEND

———	STUDY AREA BOUNDARY
←— —	DRAINAGE
====	VEHICLE ACCESS
	DEPRESSION/PIT
	MOUNDED MATERIAL
B	BUILDING
BG	BARE GROUND
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
FL	FILL
GS	GROUND SCAR(S)
HT	HORIZONTAL TANK
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
NB	NEW BUILDING(S)
R/R	RAILROAD
S&G	SAND AND GRAVEL
TR	TRENCH
VT	VERTICAL TANK
VS	VEGETATION STRESS

Figure 3. Lusher Avenue Groundwater Contamination study area, October 28, 1938. Approximate scale 1:13,000.

JULY 6, 1951 (FIGURE 4)

Northern Subarea

The Northern Subarea remains occupied by residential houses. Since 1938, additional development of residential houses and probable retail stores has occurred.

Central Subarea

Site 1 - The railroad marshaling yard remains operational; however, rail spurs have been removed from the southern portion of the railroad marshaling yard. Ground scars and earthmoving activity are also visible in the southern portions of the railroad marshaling yard. The building ruins noted in 1938 now consist of only a foundation. Piles of debris (DB) (see Figure 5) associated with the dismantling of the southern portion of the railroad marshaling yard are noted.

A ground scar is visible in the northern portion of the railroad marshaling yard near West Franklin Avenue and may reveal dumping activity.

A photographic enlargement (Figure 5) of the eastern portion of the Central Subarea has been provided to better show deal of the facilities on the eastern side of the railroad marshaling yard.

Southwest Subarea

No environmentally significant change has occurred at the Southwest Subarea since 1938.

Southeast Subarea

No environmentally significant change has occurred at the Southeast Subarea since 1938.

Figure 4. Lusher Avenue Groundwater Contamination study area, July 6, 1951. Approximate scale 1:13,000.

JULY 6, 1951 (FIGURE 5)

Central Subarea

Site 2 - The industrial manufacturing facility remains operational and the employee parking lot along Oakland Avenue is full. The staging yard along the western side of the facility is now used as a scrap yard. The scrap yard contains piles of mixed-toned material.

Site 3 - This industrial facility appears to be in use and is a probable scrap/recycling operation. A staging yard has been established west of the main building and contains piles of dark- and light-toned material.

Site 4 - A fuel/oil distributor facility, along the western side of 14th Street between Hubbard and Concord avenues, contains one small building, a group of three vertical storage tanks (VT), and a large unlined open pit southwest of the storage tanks. The facility appears to be unpaved and accessed by dirt driveways from 13th Street and Concord Avenue. The three vertical storage tanks are located within an unlined earthen secondary containment revetment. The irregular-shaped unlined open pit is approximately 50 meters x 30 meters (150 feet x 100 feet) and contains probable dark-toned (DT) liquid.

Figure 5. Lusher Avenue Groundwater Contamination study area, July 6, 1951. Approximate scale 1:3,300.

JUNE 3, 1957 (FIGURE 6)

Northern Subarea

Site 5 - A sewage treatment plant has been constructed adjacent to the St. Joseph River and extends south to the intersection of Vermont and Nappanee streets. Riparian vegetation along the bank of the St. Joseph River precludes discerning the presence of discharges or outfalls from this plant into the adjacent river.

A location with disturbed ground (DG) and fill material (FL) is noted east of Site 5. These features appear to be associated with construction.

Central Subarea

Site 1 - The railroad marshaling yard remains operational and railroad cars are present.

An open dump (Dump-1) is observed at a terrain depression in the central portion of the railroad marshaling yard. Mixed-toned mounded materials (MM) have been deposited at this dump.

Ground scar GS-1, in the northwestern portion of the railroad marshaling yard, may be the location of former open dumping. The dumping at this location may have been fill and/or possible solid waste.

Site 2 - The industrial manufacturing facility remains operational. Scrap Yard-1 on the western side of the facility appears to have been partly cleared of the piles of material noted in 1951. One pile of dark-toned material (DTM) (probable scrap metals) remains.

Site 3 - The probable scrap/recycling facility remains operational and materials stored at the facility appear better organized than in 1951. The staging yard, west of the main buildings, has been cleared and the piles of dark-toned material on the site in 1951 have been removed.

Site 4 - The fuel/oil distributor facility has been enlarged with the installation of two large horizontal storage tanks (HT) along the southern side of the previously installed three vertical storage tanks. The horizontal tanks are within a secondary containment revetment. The open pit, seen in 1951 and 1952 (1952 film analyzed but not included in this report), is absent and the ground has been filled, leveled, and revegetated.

Southwest Subarea

The area remains residential north of Leininger Avenue. A commercial facility (NB) has been constructed along the western side of 17th Street south of Markle Avenue. The area south of this new facility remains farmland.

Southeast Subarea

This portion of the study area has undergone commercial development between Lusher and Leininger avenues and east of 17th Street.

Site 6 - The commercial facility has two large buildings and a large staging yard near the buildings. A light-toned ground scar (GS-2) and bare ground (BG) are observed along the northern side of Leininger Avenue. A small open trench (TR-1) is visible at the western side of ground scar GS-2. The presence of the trench may indicate waste disposal activity at this facility.

Offsite

Auto Junkyard-1 - Offsite and west of Nappanee Street an automobile junkyard has been established.

Figure 6. Lusher Avenue Groundwater Contamination study area, June 3, 1957. Approximate scale 1:12,700.

AUGUST 20, 1965 (FIGURE 7)

Northern Subarea

Site 5 - The sewage treatment plant remains operational. The plant is landscaped with lawns and appears well maintained with good housekeeping practices. No outfalls or discharges from this plant are discerned. The fill area is inactive; the area is overgrown with grass.

A photographic enlargement (Figure 8) of the Central, Southwest, and Southeast subareas has been provided to better show detail of the features at the facilities.

Offsite

Auto Junkyard-1 - The offsite junkyard west of Nappanee Street has been significantly enlarged.

Figure 7. Lusher Avenue Groundwater Contamination study area, August 20, 1965. Approximate scale 1:12,200.

AUGUST 20, 1965 (FIGURE 8)

Central Subarea

Site 1 - The railroad marshaling yard remains operational and railroads cars are present. The open dump at the depression within the railroad marshaling yard remains active.

A large scrap yard (Scrap Yard-2) has been created within the railroad marshaling yard adjacent to the western side of scrap/recycling facility at Site 3. This scrap yard extends into Dump-1 and contains piles of mixed-toned materials, including probable scrap metals.

A probable open dump (Dump-2) is located along the northern central perimeter of the railroad marshaling yard. Most of this area is covered with piles of mixed-toned material. Another probable open dump (Dump-3) is located near the northeast perimeter of the railroad marshaling yard. Most of this area is also covered with piles of mixed-toned material.

Site 2 - The industrial manufacturing facility remains operational and vehicles are in the employee parking lot. Scrap Yard-1, noted on the western side of the facility in 1957, is absent and the area appears free of piles of mixed-toned material.

Site 3 - The probable scrap/recycling facility along the western side of 14th Street is operational. Several additional buildings have been constructed on the property. An employee parking lot is in the southern portion of the facility. Piles of light- and mixed-toned material are in the staging yards around the buildings.

Site 4 - The fuel/oil distributor, on the western side of 14th Street, remains operational. This distributer now occupies a smaller lot, situated between two separate commercial facilities, one to the east and one to the west. The fuel distributer has increased the number of vertical storage tanks inside the revetment to nine. The two horizontal storage tanks remain in place.

Site 8 - A commercial facility has been constructed within the former railroad marshaling yard near the intersection of Lusher Avenue and Nappanee Street. The facility contains three large buildings and a storage yard in the northern portion of the facility near the railroad tracks.

Site 9 - A commercial facility has been constructed within the railroad marshaling yard near the intersection of Lusher Avenue and 18th Street. The facility contains one main building, a truck parking area on the eastern side of the main building, and an open waste disposal pit (Pit-2) in the northern portion of the facility near the railroad tracks. Pit-2 appears to be unlined and contains mixed-toned material.

Site 11 - A commercial facility under construction within the railroad marshaling yard, near the intersection of Lusher Avenue and 17th Street, contains one large building and three support buildings. Another building foundation and ground scars are evident in the northern portion of the facility.

Southwest Subarea

Site 7 - Since 1957 a second commercial facility has been constructed along the western side of 17th Street at the intersection with Leininger Avenue. This facility contains one large main building and a large parking apron around the building.

TR-2 - An open disposal trench with an east-west orientation has been dug on the western side of 17th Street and is accessed by a dirt road from 17th Street. The trench contains debris.

GS-5 - A large ground scar with an east-west orientation is observed between Site 7 and Site 12, south of trench TR-2. The ground scar is accessed by a trail from 17th Street. The ground scar in proximity to trench TR-2, may be associated with disposal activity related to trench TR-2.

Site 12 - Another commercial facility has been built along the western side of 17th Street and Hively Avenue. This facility contains a large main building and a large parking apron around the building. The are numerous truck trailers parked at this facility.

Site 13 - A probable fuel/oil distributor has been established along Fieldhouse Avenue west of 18th street. The facility contains one large building, a truck-loading shed, and a group of seven vertical storage tanks within a probable secondary containment wall.

Southeast Subarea

Site 6 - The commercial facility remains operational. Ground scar GS-2 and the bare ground noted on the southern side of the buildings in 1957 remain. Three trenches are noted near the southeastern corner of the main building and may be associated with nearby construction activity. Trench TR-1 observed in 1957 is no longer discerned. Construction activity in this area is suspected. An additional ground scar and vehicle tracks are visible in the open lot west of the site.

GS-3 - A large ground scar is visible east of Site 6 along the northern side of Leininger Avenue. This ground scar is connected to Site 6 by several vehicle trails. A mound of possible soil has been deposited on the eastern side of the ground scar and may indicate earthmoving activity.

Site 10 - A commercial facility has been constructed along the eastern side of 17th Street and south of Leininger Avenue. The facility contains two buildings and a staging area at the northern side of the property along Leininger Avenue.

GS-4 - A large ground scar is observed in the southern portion of Site 10. The ground scar has linear patterns of earth that suggest trenches may have been dug and filled in this disturbed area.

LEGEND

	STUDY AREA BOUNDARY
	DRAINAGE
	VEHICLE ACCESS
	DEPRESSION/PIT
	MOUNDED MATERIAL
B	BUILDING
BG	BARE GROUND
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
FL	FILL
GS	GROUND SCAR(S)
HT	HORIZONTAL TANK
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
NB	NEW BUILDING(S)
R/R	RAILROAD
S&G	SAND AND GRAVEL
TR	TRENCH
VT	VERTICAL TANK
VS	VEGETATION STRESS

Figure 8. Lusher Avenue Groundwater Contamination study area, August 20, 1965. Approximate scale 1:7,100.

AUGUST 28, 1967 (FIGURE 9)

Northern Subarea

No environmentally significant change has occurred at the Northern Subarea since 1965.

Site 5 - The sewage treatment plant remains operational.

A photographic enlargement (Figure 10) of the Central, Southwest, and Southeast subareas has been provided to better show details of the features at the facilities.

Offsite

Auto Junkyard-1 - The offsite junkyard west of Nappanee Street has been enlarged.

Figure 9. Lusher Avenue Groundwater Contamination study area, August 28, 1967. Approximate scale 1:12,900.

AUGUST 28, 1967 (FIGURE 10)

Central Subarea

Site 1 - The railroad marshaling yard remains operational and railroads cars are present. Dump-1, located in a depression within the railroad marshaling yard, is served by dirt roads and continues to receive solid waste. A dark stain is noted a the bottom of the depression. Scrap Yard-2 has been extended onto Dump-1 so that it is difficult to discriminate between piles of solid waste and mounds of scrap material. Scrap Yard-2 now contains very large mounds of mixed-toned material (probable scrap metals).

Dump-2 remains active along the north central perimeter of the railroad marshaling yard. Most of Dump-2 is covered with piles of mixed-toned material. Dump-3 remains in place near the northeastern perimeter of the railroad marshaling yard. Most of Dump-3 is covered with piles of mixed-toned material. Three ground scars are observed between Dump-2 and Dump-3.

Site 2 - The industrial manufacturing facility remains operational. Vehicles are in the employee parking lot.

Site 3 - The probable scrap/recycling facility adjacent to Scrap Yard-2 remains operational; vehicles are parked in the employee parking lot.

Site 4 - The fuel/oil distributor facility remains operational. The facility continues to manage nine vertical and two horizontal storage tanks.

Pit-4 - A disposal pit is observed west of Site 4 and east of 16th Street. The pit contains light-toned material and possible sludge. The light-toned material is also spilled around the rim of the pit.

Site 8 - The commercial facility at the intersection of Lusher Avenue and Nappanee Street remains operational. An unlined disposal pit (Pit-3) is discerned in the northeastern corner of the facility, adjacent to the railroad tracks. Light-and dark-toned material is observed at the bottom of the disposal pit.

Site 9 - The commercial facility at the intersection of Lusher Avenue and 18th Street remains operational. Pit-2 in the northern portion of the property appears to be in service, but it has been decreased in size.

Sand and Gravel - A sand and gravel (S&G) operation has been established in the former railroad marshaling yard between Site 9 and Site 11, and northeast of the ruins/foundation feature. Large deposits of probable light-toned sand are observed next to the conveyor equipment.

Site 11 - The commercial facility along Lusher Avenue and east of 17th Street appears operational. Three buildings have been built in the northern portion of the facility where a large ground scar was observed in 1965. A possible disposal pit is discerned in the northern portion of the property. The pit contains debris. A ground scar is observed north of the possible disposal pit.

Southwest Subarea

Site 7 - The facility has been expanded west toward 18th Street; however, 18th Street does not connect to the site. The expansion area contains a drainage channel that trends northwest.

TR-2 - The open disposal trench, visible in 1965, is absent and the area has been leveled and graded. Bare ground is visible at this location.

GS-5 - The area of ground scars and bare ground has been expanded; it now extend along the western side of 17th Street from Leininger to Hively avenues. The ground scars do not appear to be related to construction site preparation. The ground scars may indicate possible waste disposal activity at this location. The ground scars are in proximity to the location of the former open disposal trench TR-2 and the nearby disposal pit Pit-4 noted in 1965.

Pit-5 - A disposal pit has been dug west of the previously observed open disposal trench TR-2. This new disposal pit appears to contain debris. The new pit is only accessible via a dirt road connecting to 17th Street.

Site 12 - The commercial facility appears vacant and in transition. All of the truck trailers observed at the facility in 1965 are absent. No vehicles are discerned. Ground scars are visible across the parking apron and extend north into the large ground scar GS-5.

Site 13 - The probable fuel/oil distributor with seven vertical storage tanks remains operational.

Southeast Subarea

Site 6 - The commercial facility remains operational. A new building has been added on the southern side of the main building. Three trenches, ground scar GS-2, and bare ground were previously noted at this location.

GS-3 - The ground scar remains visible east of Site 6 along Leininger Avenue. This ground scar is apparently the result of construction activity. The mound of possible soil visible in 1965 is not evident.

Pit-6 - A disposal pit has been dug north of Site 6 along the northern side of Leininger Avenue. The objects at the bottom of the pit can not be identified. A large ground scar and and bare ground are visible on the western side of the pit. Another ground scar and debris are visible north of Pit-6.

Site 10 - The commercial facility remains operational. Ground scar GS-4 near the intersection of 17th Street and West Hively Avenue is becoming revegetated.

LEGEND

———	STUDY AREA BOUNDARY
←– – –	DRAINAGE
= = = =	VEHICLE ACCESS
	DEPRESSION/PIT
	MOUNDED MATERIAL
B	BUILDING
BG	BARE GROUND
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
FL	FILL
GS	GROUND SCAR(S)
HT	HORIZONTAL TANK
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
NB	NEW BUILDING(S)
R/R	RAILROAD
S&G	SAND AND GRAVEL
TR	TRENCH
VT	VERTICAL TANK
VS	VEGETATION STRESS

Figure 10. Lusher Avenue Groundwater Contamination study area, August 28, 1967. Approximate scale 1:7,120.

JULY 13, 1973 (FIGURE 11)

Northern Subarea

Site 5 - The sewage treatment plant has been enlarged with the addition of several waste water treatment lagoons and settling tanks along both sides of Nappanee Street. A discharge plume is visible along the river bank on the eastern side of the Nappanee Street bridge.

A photographic enlargement (Figure 12) of the Central, Southwest, and Southeast subareas has been provided to better show details of the features at the facilities.

Offsite

Auto Junkyard-1 - The offsite junkyard west of Nappanee Street remains operational.

Figure 11. Lusher Avenue Groundwater Contamination study area, July 13, 1973. Approximate scale 1:13,650.

JULY 13, 1973 (FIGURE 12)

Central Subarea

Site 1 - The railroad marshaling yard is operational and railroad cars are present. The depression at Dump-1 has been filled and waste dumping at this location has apparently ceased.

Scrap Yard-2 remains operational and contains piles of mixed-toned material (probable scrap metals).

Light-toned fill material has been deposited in a fill area on the eastern side of former Dump-2. Waste dumping at this location appears to have ceased.

Dump-3, not visible on this photo figure, is no longer in use.

Site 2 - The industrial manufacturing facility remains operational; vehicles are in the employee parking lot.

Site 3 - The probable scrap/recycling facility remains operational; vehicles are in the employee parking lot.

Site 4 - The fuel/oil distributor facility appears operational. The two previously observed horizontal storage tanks have been removed.

Pit-4 - The disposal pit, observed in 1967, is absent and the area has been leveled and graded. The spillage of light-toned material around the former pit is not evident.

Site 8 - The commercial facility remains operational. Unlined Pit-3, noted in 1967, is not discerned.

Site 9 - The commercial facility remains operational. The open waste disposal pit (Pit-2) at the northern portion of the property is in use. This disposal pit contains mixed-toned material.

Sand and Gravel - The sand and gravel operation remains operational. The extent of the bare ground and the light-toned sand-gravel stockpiles at the facility has increased compared to what was observed in 1967. The nearby location of the ruins/foundation has become an open dumping location and contains piles of debris.

Site 11 - The commercial facility remains operational. The possible disposal pit noted in 1967 is not discerned; however, another possible disposal pit has been dug near the northern perimeter of the property. This new, possible disposal pit contains debris.

Southwest Subarea

Site 7 - The facility has not changed significantly since 1967.

Pit-5 - The disposal pit remains visible and it appears to contain debris.

GS-5 - The ground scars and bare ground are no longer evident; the location is now revegetated.

Site 12 - The facility appears operational again and the ground scars noted at the facility in 1967 are absent. There are once again numerous truck trailers observed at the facility parking apron.

Site 13 - The probable fuel/oil distributor is likely no long operational; the seven vertical storage tanks have been removed. No ground scars are visible at the site to suggest underground storage tanks have been installed to replace the absent storage tanks.

TR-3 - A large unlined possible disposal trench has dug been on the eastern side of Nappanee Street on former farmland. The trench is approximately 135 meters (44 feet) long and approximately 30 meters (98 feet) wide and contains deposits of dark-toned material. The trench is accessible via a dirt road linked to Nappanee Street.

TR-4A/TR-4B - Two parallel unlined possible disposal trenches have been dug west of disposal Pit-5 on former farmland. The trenches are approximately 120 meters (393 feet) long and each is approximately 20 meters (65 feet) wide. The trenches contain mixed light-and dark-toned material. The trenches are accessed via a dirt road.

Southeast Subarea

Site 6 - The commercial facility remains operational.

GS-3 - The ground scar, observed east of Site 6, is now partially revegetated. No waste disposal activity is noted at this location.

Pit-6 - The previously observed disposal pit is absent. The ground has been leveled although the area still appears disturbed and has numerous ground scars. No waste disposal activity is noted.

Site 10 - The commercial facility remains operational and no waste disposal activity is noted.

GS-4 - This area is partially overgrown.

Construction activity is visible southeast of Site 6.

Figure 12. Lusher Avenue Groundwater Contamination study area, July 13, 1973. Approximate scale 1:6,640.

MAY 2, 1981 (FIGURE 13)

Northern Subarea

Site 5 - The sewage treatment plant remains operational. It has undergone renovation/modification along the western side of the plant where large ground scars are visible. The discharge plume from this plant into the adjacent St Joseph River remains visible.

A photographic enlargement (Figure 14) of the Central, Southwest, and Southeast subareas has been provided to better show detail of features at the facilities.

Offsite

Auto Junkyard-1 - The offsite junkyard west of Nappanee Street remains operational.

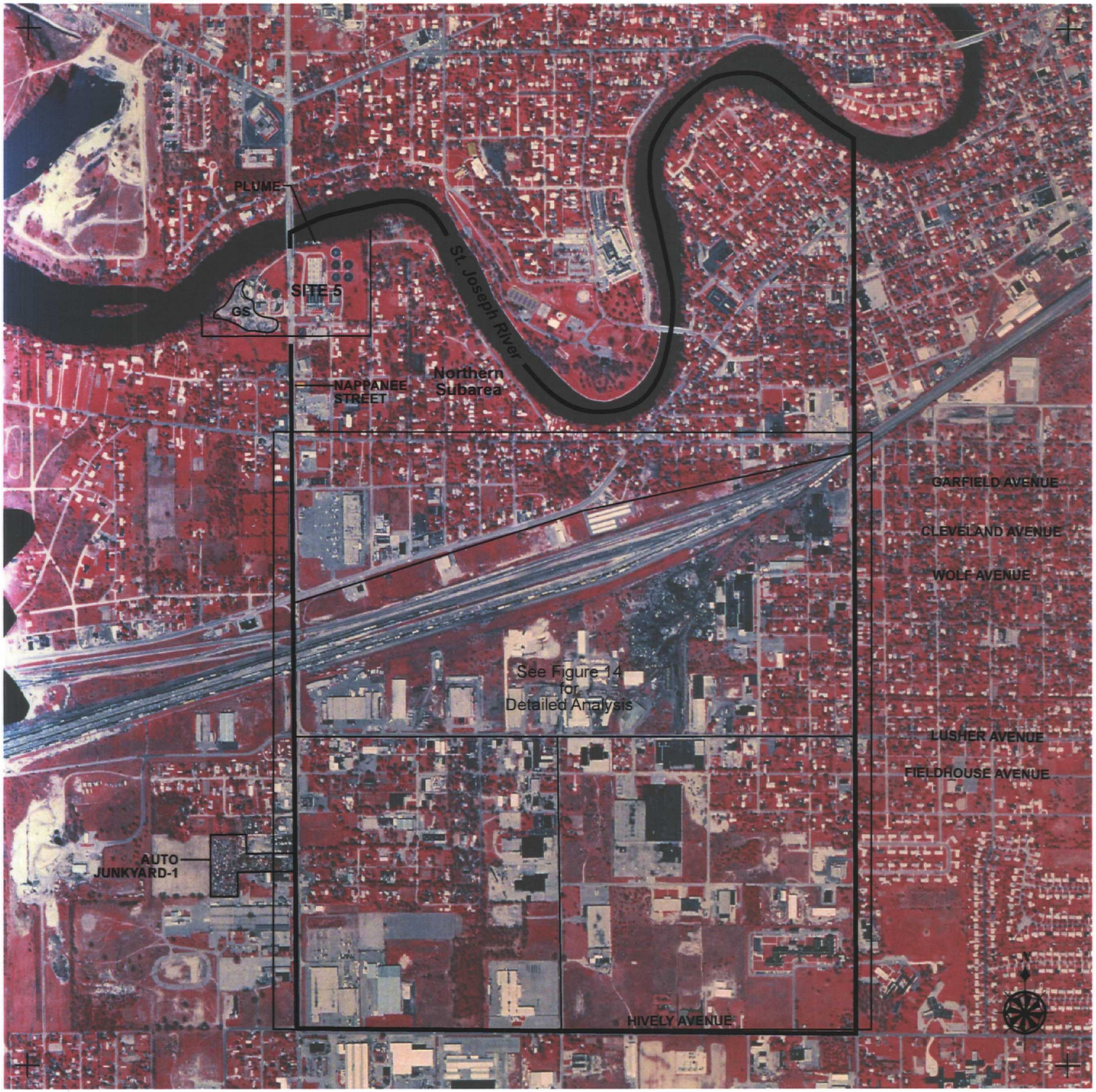

Figure 13. Lusher Avenue Groundwater Contamination study area, May 2, 1981. Approximate scale 1:13,650.

MAY 2, 1981 (FIGURE 14)

Central Subarea

Construction of new commercial facilities and the expansion of existing commercial facilities along Lusher Avenue has continued. Several of the buildings erected after 1973 are annotated (NB).

Site 1 - The railroad marshaling yard appears operational and railroads cars are present.

Scrap Yard-2 remains operational and contains piles of mixed-toned material.

Site 2 - The industrial manufacturing facility may not be operational and may be vacant. No trucks are discerned onsite, the employee parking appears to be vacant, and vegetation has encroached into driveways.

Site 3 - The probable scrap/recycling facility appears operational.

Site 4 - The previously observed fuel/oil distributor is absent. All storage tanks have been removed.

Site 8 - The commercial facility remains operational.

Site 9 - The commercial facility remains operational. Pit-2 observed at the northern portion of the property in 1973 is no longer evident. Dumping at this location appears to have ceased and the area has become overgrown. A new probable disposal trench has been dug along the western side of the main building.

Sand and Gravel - The sand and gravel operation remains operational. Dumping appears to have ceased at the nearby ruins/foundation location. The area has become overgrown.

Site 11 - The commercial facility appears operational. The disposal pit noted in 1973 is not evident and the location has become overgrown. Dumping at this location appears to have ceased.

Southwest Subarea

Site 7 - The facility remains operational. Since 1973 a drainage ditch has been dug across the western portion of the facility.

GS-6 - The disposal pit (Pit-5) observed in 1973 is absent and waste dumping at this location appears to have ceased. Mounded material, probably fill or soil, are now observed at this location.

Site 12 - The facility does not appear to have been changed significantly since 1973.

Site 13 - The former probable fuel/oil distributor now appears to be vacant and the property is becoming overgrown with vegetation.

TR-3 - The large unlined possible disposal trench remains open and has become partially overgrown with vegetation.

TR-4A/TR-4B - The two parallel unlined possible disposal trenches observed in 1973 are absent. The location has been leveled and revegetated.

Southeast Subarea

Site 6 - The commercial facility remains operational. A ground scar and bare ground are visible in the northeastern corner of the property; however, no waste disposal activity is evident.

GS-3 - The ground scar east of Site 6 continues to be revegetated. No waste disposal activity is noted at this location.

Site 10 - The commercial facility remains operational and no waste disposal activity is noted.

GS-4 - This area remains partially vegetated.

The construction activity near the intersection of Oakland and West Hively avenues has evidently been completed. A group of landscaped residential buildings are now at this location.

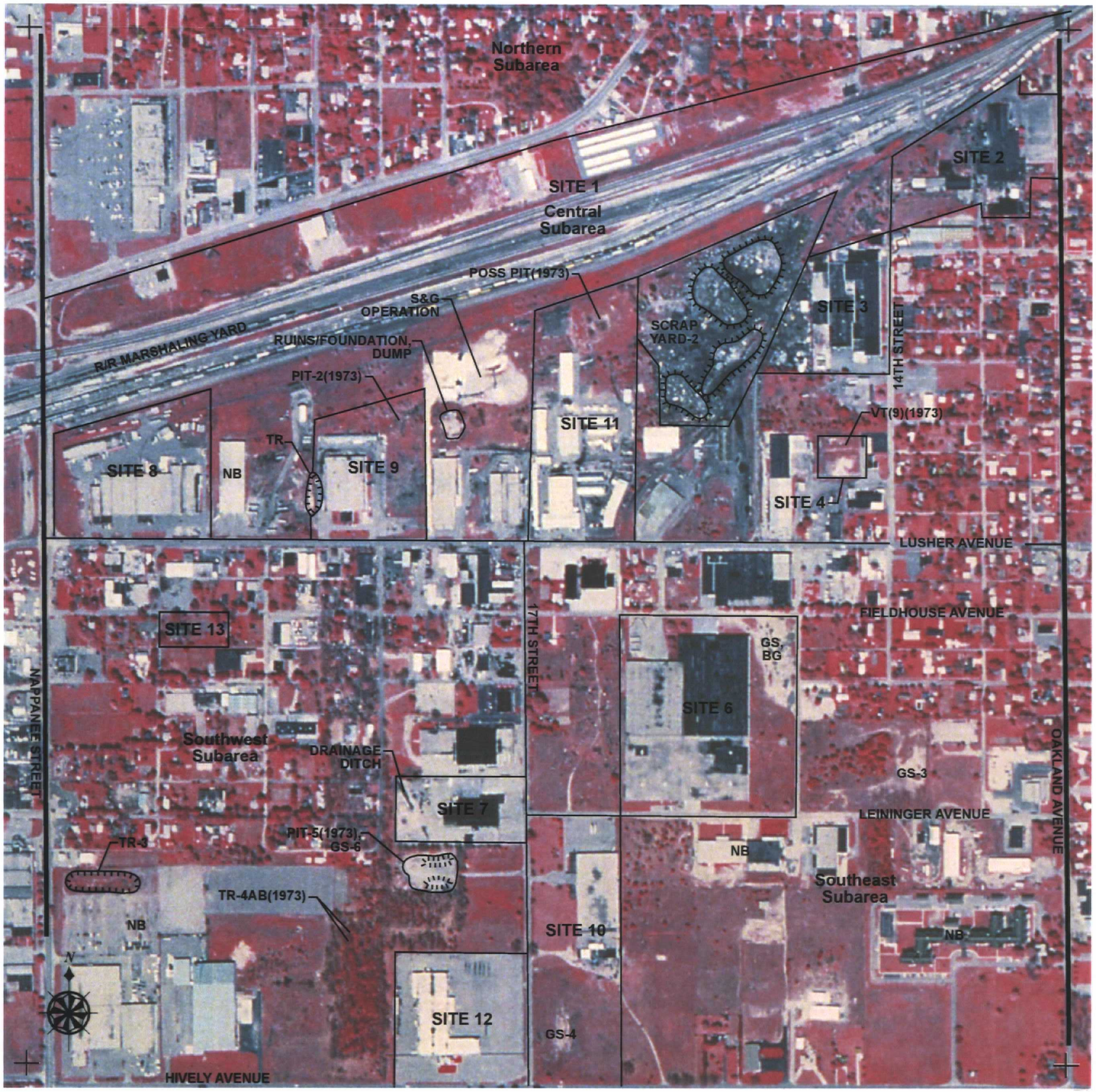

Figure 14. Lusher Avenue Groundwater Contamination study area, May 2, 1981. Approximate scale 1:7,120.

JULY 17, 1987 (FIGURE 15)

Northern Subarea

Site 5 - The sewage treatment plant remains operational. Construction activity is observed on the eastern side of the facility where there is a large ground scar. The discharge plume noted in 1981 is not evident.

Central Subarea

Site 1 - The railroad marshaling yard appears operational and railroad cars are present.

Scrap Yard-2 - The large scrap yard remains operational. It contains large mounds of mixed-toned material (probable scrap metals), and piles of probable debris.

Site 2 - The industrial manufacturing facility appears to be vacant. Much of the staging yard area continues to be overgrown.

Site 3 - The probable scrap/recycling facility appears operational.

Site 4 - The former fuel/oil distributor property is vacant and now partially revegetated.

Site 8 - The commercial facility remains operational.

Site 9 - The commercial facility remains operational and the open disposal pit in the northern portion of the property remains in place. Active dumping into the pit may have ceased as evidenced by the dense vegetation overgrowth at the location.

Sand & Gravel - The sand and gravel operation remains operational. The nearby former dump at the location of the ruins/foundation is a disturbed area with ground scars and is partially overgrown.

Site 11 - The commercial facility appears operational.

Southwest Subarea

Site 7 - The facility remains operational and a new building has been constructed in the western portion of the facility. The drainage ditch across the western addition to the facility remains visible.

GS-6 - At this location a ground scar and mounded material (probable fill) are observed.

Site 12 - The facility remains operational. No environmentally significant changes are discerned at this location since 1981.

TR-3 - The large unlined possible disposal trench on the eastern side of Nappanee Street remains in place.

Southeast Subarea

Site 6 - The commercial facility remains operational. The ground scars noted in the northeastern corner of the property remain, but no waste disposal activity is evident.

GS-3 - The ground scar east of Site 6 continues to be revegetated. No waste disposal activity is noted at this location.

Site 10 - The commercial facility remains operational. No waste disposal activity is noted.

Construction activity is observed at the commercial facility south of Site 6. A new building has been constructed along the southern side of main building present in 1981. A ground scar and mound of light-toned material are noted. No waste disposal activity is observed at this location.

Offsite

Auto Junkyard-1 - The junkyard is no longer operational; the derelict automobiles have been removed.

Figure 15. Lusher Avenue Groundwater Contamination study area, July 17, 1987. Approximate scale 1:13,650.

2000 (FIGURE 16)

Monoscopic photographic coverage was used to perform the 2000 analysis. Because stereoscopic coverage was no used, the features and conditions visible on photographs from other years of analysis may not be discerned on the 2000 photograph, and the following analysis may not be as detailed.

Northern Subarea

Site 5 - The sewage treatment plant remains operational and the construction noted in 1987 has been completed.

Central Subarea

Site 1 - The railroad marshaling yard appears operational and railroads cars are present.

Scrap Yard-2 - The scrap yard remains operational and contains piles of mixed-toned material (probable scrap metals).

Site 2 - The industrial manufacturing facility is undergoing dismantling and portions of the staging yard around the vacant buildings have been cleared of vegetation.

Site 3 - The commercial facility is undergoing modifications. The large building on the eastern side of the facility has been removed.

Site 4 - The property is now occupied by a large building.

Site 9 - The commercial facility remains operational. The pit observed in 1987 is no longer visible.

Site 8 - The commercial facility remains operational. New buildings have been added in the northern portion of the site.

Junk Yard-2 (Sand & Gravel) - The sand and gravel operation appears to have ceased and a automobile junk yard has been established on the property.

Site 11 - The commercial facility remains operational.

Southwest Subarea

Site 7 - The commercial facility remains operational. The drainage trench noted in 1987 is no longer discerned and may have been replaced by a buried culvert. The area has been leveled and graded.

GS-6 - At this location a ground scars remains visible.

TR-3 - The large unlined possible disposal trench previously observed on the eastern side of Nappanee Street in 1987 has become overgrown.

Site 12 - The facility remains operational.

Southeast Subarea

A commercial facility has been built on the eastern side of Site 12. The facility contains one large main building and a large parking apron around the main building.

Site 6 - The commercial facility remains operational. The location of the ground scars noted in the northeastern corner of the facility have been paved to form a truck-trailer parking lot.

Site 10 - The commercial facility remains operational.

Since 1987 a building has been constructed south of Site 6. No waste disposal activity is observed at this facility.

Offsite

Auto Junkyard-1 - The automobile junkyard has been removed since 1987.

Figure 16. Lusher Avenue Groundwater Contamination study area, 2000. Approximate scale 1:13,650.

JULY 24, 2005 (FIGURE 17)

Monoscopic photographic coverage was used to perform the 2005 analysis. Because stereoscopic coverage was no used, the features and conditions visible on photographs from other years of analysis may not be discerned on the 2005 photograph, and the following analysis may not be as detailed.

Northern Subarea

Site 5 - The sewage treatment plant remains operational and has not been significantly changed since 2000. No discharge plume is visible.

Central Subarea

Site 1 - The railroad marshaling yard appears operational and railroads cars are present.

Scrap Yard-2 - The scrap yard remains operational and contains piles of mixed-toned material (probable scrap metals).

Site 2 - Additional buildings at the industrial manufacturing facility have been dismantled. An open staging area has been created on the western side of the remaining buildings.

Site 3 - The commercial facility remains operational. Vehicles are in the employee parking lot.

Site 8 - The commercial facility remains operational.

Site 9 - The commercial facility remains operational.

Auto Junkyard-2 - The automobile junk yard that now occupies the property is operational. Visible signs of the former sand and gravel operation at this property are not evident.

Southwest Subarea

Site 7 - The commercial facility is operational and has been enlarged. The facility now extends south along 17th Street and includes the former open grassy area, where ground scar GS-5 was observed in 1967.

The location formerly occupied by trench TR-3 has undergone commercial development.

Site 12 - The facility remains operational.

Southeast Subarea

Site 6 - The commercial facility remains operational.

Site 10 - The commercial facility remains operational.

An area of probable disturbed ground, possibly the result of vegetation stress (VS), is visible near the location of former disposal Pit-6.

Figure 17. Lusher Avenue Groundwater Contamination study area, July 24, 2005. Approximate scale 1:13,650.

AUGUST 27, 2010 (FIGURE 18)

Monoscopic photographic coverage was used to perform the 2010 analysis. Because stereoscopic coverage was no used, the features and conditions visible on photographs from other years of analysis may not be discerned on the 2010 photograph, and the following analysis may not be as detailed.

Figure 18 presents analysis findings for 2010, in addition it serves as a summary figure for all the features/conditions of environmental significance and are annotated for reference. The final date for which activity was observed at the feature/condition are given in parenthesis.

Northern Subarea

Site 5 - The sewage treatment plant remains operational. There are no visible discharges into the adjacent St. Joseph River.

Central Subarea

Site 1 - The railroad marshaling yard remains operational and railroads cars are present. The location of the former probable Dump-2 and probable Dump-3 are annotated.

Scrap Yard-2 - The former scrap yard has been significantly cleared of the large and widespread piles of mixed-toned scrap material that were visible in 2005. The few piles of material that are observed appear to be either gravel and soil likely associated with cleanup activity and not scrap/recycling.

Site 2 - The abandoned industrial manufacturing facility buildings noted in 2005 have been removed. The property appears to be a salvage yard with piles of dark- and light-toned materials deposited since 2005. The location of the former Scrap Yard-1 is annotated.

Site 3 - The commercial facility appears to be unoccupied. No vehicles or trucks are discerned. The location of the former Staging Area is annotated.

Site 4 - The commercial facility is operational. The locations of the former Pit-1 and the former storage tanks associated with the former fuel/oil distributor are annotated.

Site 8 - The commercial facility remains operational. The location of former Pit-3 is annotated.

Site 9 - The commercial facility remains operational. The locations of the former TR and Pit-2 are annotated.

Junk Yard-2 - The junk yard is vacant. Several derelict vehicles and debris remain; although, the junk yard has been generally cleaned up.

The location of the former Ruins/Foundation and Dump is annotated.

Site 11 - The commercial facility remains operational. The locations of the former pits are annotated.

Pit-4 - The property is occupied by a commercial facility. The former location of the pit is annotated.

Southwest Subarea

Site 7 - The commercial facility remains operational. Four vertical storage tanks are discerned. The location of former trench TR-2 is annotated.

Site 12 - The facility remains operational.

Just north of Site 12 is the location of former ground scar GS-5. The location has been annotated.

Pit-5/GS-6 - The location of former Pit-5 and ground scar GS-6 are situated south of Site 7 and are annotated.

TR-3 - The location of the former trench TR-3 extends across two businesses and is annotated.

TR-4A/TR-4B - The locations of the former disposal trenches are annotated.

Site 13 - The location of the former fuel/oil distributor is annotated.

Southeast Subarea

Site 6 - The commercial facility remains operational. The location of former trench TR-1, on the western edge of the facility is annotated.

GS-3 - The location of the former ground scar is now occupied by an operational commercial facility.

The area of probable disturbed ground, possibly the result of vegetation stress (VS), is again visible near the location of former disposal Pit-6.

Pit-6 - The location of the former disposal pit is an undeveloped grassy field and is annotated.

Site 10 - The commercial facility remain operational.

GS-4 - At the location of the former ground scar is a commercial facility. The location of the former ground scar is annotated.

Figure 18. Lusher Avenue Groundwater Contamination study area, August 27, 2010. Approximate scale 1:13,650.

GLOSSARY

Access Road - A paved or unpaved route of vehicular access.

Auto Junkyard - A yard for the collection, storage, and resale of junked vehicles and parts of vehicles.

Auto Salvage Yard - A yard for the collection, storage, and resale of junked vehicles and the salvage of junked vehicles for scrap metal.

Building (B) - A relatively permanent, essentially boxlike construction having a roof.

Dark- (DT), Medium- (MT), or Light-Toned (LT) - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris (DB) - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Ditch - A long narrow excavation, as for draining or irrigating land.

Fill (FL) - Earth, stones, or other material that is used to build up the level of an area of ground.

Graded Area - An area where the surface of the ground has been leveled or altered by a vehicle pulling or pushing a wide blade.

Ground Scar (GS) - An area of bare soil, apparently the result of human activity.

Liquid - Used when discussing impoundments, lagoons, catchment basins, or features that contain a liquid or when discussing discharge from outfalls, at storm drains, or tank trucks.

Material (M) - Raw or waste materials on or in the vicinity of the site.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

Plume - The detectable emission from an outfall or smokestack.

Sand/Gravel Pit - A surface mine from which sand and/or gravel are extracted.

Scrap Yard - An open storage yard used primarily in scrap/recycling operations for the storage and staging of scrap materials.

Trench (TR) - A long, narrow excavation unrelated to drainage.

Vegetation Stress (VS) - Describes a condition wherein vegetation has been weakened (but not irreversibly damaged) by lack of water, disease, or exposure to toxic substances.

REFERENCES

MAPS

Source[a]	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2	Elkhart, IN	1:24,000	1994
USGS	2	Osceola, IN	1:24,000	1994

COLLATERAL INFORMATION

EPA. 2011. Collateral data and Site- map supplied by EPA Region 5 as attachment to Remote Sensing Services Request Form.

AERIAL PHOTOGRAPHS

Photo source[a]	Figure[b]	Date of acquisition	Original scale	Film type[c]	Mission I.D.	Source frame #	EPIC ID #
NAS/VIP	3	10-28-38	1:23,100	B&W	BFB-2	56,57	21216,21217
USGS	4,5	07-06-51	1:20,600	B&W	BFB-3H	184-186	-
USGS	-	03-29-52	1:20,500	B&W	GS-PK	4-45,46	21665,21665
USGS	6	06-03-57	1:20,600	B&W	BFB-4T	87,86	-
USGS	-	06-09-60	1:60,000	B&W	R-129	12874-12876	-
USGS	7,8	08-20-65	1:20,300	B&W	BFB-1FF	76,77	71268,71269
						74,75	-
USGS	9,10	08-28-67	1:24,600	B&W	GS-VBTZ	45-47	20451-20453
USDA/FSA	11,12	07-13-73	1:38,200	B&W	18038	64,65	76361,71265
USGS	-	05-02-81	1:58,700	B&W	HAP80	133	20514
USGS	13,14	05-02-81	1:58,700	CIR	HAP80	177	21273
USGS	-	06-23-86	1:60,000	CIR	NHAP	105,106	21276,21277
USGS	15	07-17-87	1:44,900	CIR	NAPP	9,10	21174,21175
USDA/FSA	16	00-00-00	1:12,000	B&W	NAIP00	-	-
USDA/FSA	17	07-24-05	1:24,000	CC	NAIP05	DOQQ	-
USDA/FSA	18	08-27-10	1:24,000	CC	NAIP10	DOQQ	-

[a]NAS/VIP National Aerial Survey Center Corp/Visual Image Presentations, Silver Spring, Maryland
USDA/FSA U.S. Department of Agriculture/Farm Service Agency, Salt Lake City, Utah
USGS U.S. Geological Survey, Washington, D.C.
[b]Photographs listed with no figure number were analyzed but not placed in this report.
[c]B&W Black-and-white
CIR Color infrared
CC Conventional Color